Claims

1. Method for monitoring of a communication link between a source network node and a destination network node, which communication link employs the IPSec protocol, said method comprising at least the step of transmission of an acknowledgement packet by the destination network node if at least one of a first condition and a second condition is fulfilled,
said first condition being the reception of at least a predetermined number of IPSec packets after transmission of the previous acknowledgement packet, and
said second condition being the reception of a packet via the communication link after a predetermined time has passed after transmission of the previous acknowledgement packet.

2. A method according to claim 1, wherein said acknowledgement packet comprises at least the sequence number of the last received IPSec packet and at least one value corresponding to the amount of data received via the communication link.

3. A method according to claim 2, wherein said acknowledgement packet comprises at least a packet counter value indicating the number of packets received via the communication link.

4. A method according to claim 2, wherein said acknowledgement packet comprises at least a byte counter value indicating the number of bytes received via the communication link.

5. A method according to claim 2, wherein said acknowledgement packet comprises at least a packet counter value indicating the number of packets received via the communication link and a byte counter value indicating the number of bytes received via the communication link.

6. A method according to claim 2, further comprising at least the step of determining the packet success rate of the communication link at least partly on the basis of information contained in an acknowledgement packet.

7. A method according to claim 2, further comprising at least the step of determining the throughput of the communication link at least partly on the basis of information contained in an acknowledgement packet.

8. A method according to claim 1, further comprising at least the steps of
- storing of the sequence number and the transmission time of each IPSec packet transmitted from the source network node to the destination network node in a memory means, and
- determining the round trip time of the communication link on the basis of the reception time of an acknowledgement packet and the stored transmission time of the corresponding transmitted packet.

9. Method for monitoring of a plurality of communication links between a source network site and a destination network site, each of the sites having at least one network node,
in which method an active communication link is monitored and an inactive communication link is monitored,
said method comprising at least the following steps for monitoring an active communication link between the source network site and the destination network site, the active communication link employing the IPSec protocol:
the step of transmission of an acknowledgement packet by the destination network node if at least one of a first condition and a second condition is fulfilled,
said first condition being the reception of at least a predetermined number of IPSec packets after transmission of the previous acknowledgement packet, and
said second condition being the reception of a packet via the communication link after a predetermined time has passed after transmission of the previous acknowledgement packet,
and said method comprising at least the following steps for monitoring an inactive communication link between the source network site and the destination network site:
- transmitting a probe packet from a source node at the source network site via said inactive communication link to a destination node at the destination network site,
- storing the transmission time of said probe packet in a memory means,
- transmitting a response packet from said destination node to said source node as a response to receiving a probe packet,
- determining the round trip time of said inactive communication link from the difference of the reception time of the response packet and the stored transmission time of the corresponding probe packet.

10. A method according to claim 9, said method further comprising the steps of

- transmitting a plurality of probe packets from said source node at the source network site via said inactive communication link to said destination node at the destination network site,
- receiving response packets to said probe packets, and
- determining the packet success rate of said inactive communication link from the number of said received response packets and the number of transmitted probe packets.

11. A network node for communicating with the IPSec protocol with a second network node via a communication link, said network node comprising at least
- means for receiving acknowledgement packets for IPSec packets transmitted by the network node,
- means for obtaining a sequence number of an IPSec packet from a received acknowledgement packet,
- means for obtaining a value from the acknowledgement packet, said value corresponding to the amount of data received via the communication link by the second network node, and
- means for determining the packet success rate of the communication link at least partly on the basis of said value.

12. A network node according to claim 11, further comprising at least means for determining the throughput of the communication link at least partly on the basis of said value.

13. A network node according to claim 11, further comprising at least
- means for storing in a memory means the sequence number and the transmission time of each IPSec packet transmitted by the network node via the communication link, and
- means for determining the round trip time of the communication link on the basis of the reception time of an acknowledgement packet and the stored transmission time of the corresponding transmitted packet.

14. A network node for communicating with the IPSec protocol with a second network node via a communication link, said network node comprising at least means for transmission of an acknowledgement packet if at least one of a first condition and a second condition is fulfilled,
said first condition being the reception of at least a predetermined number of IPSec packets after transmission of the previous acknowledgement packet, and

said second condition being the reception of a packet via the communication link after a predetermined time has passed after transmission of the previous acknowledgement packet.

15. A network node according to claim 14, said network node further comprising at least means for including a sequence number of a received IPSec packet and at least one value corresponding to the amount of data received via the communication link in said acknowledgement packet.

16. A network node according to claim 15, said network node further comprising at least means for including a packet counter value in said acknowledgement packet, said packet counter value indicating the number of packets received via the communication link.

17. A network node according to claim 15, said network node further comprising at least means for including a byte counter value in said acknowledgement packet, said byte counter value indicating the number of bytes received via the communication link.

18. A network node for communicating with the IPSec protocol with a second network node via a communication link, said network node comprising at least

- means for transmission of an acknowledgement packet if at least one of a first condition and a second condition is fulfilled,

said first condition being the reception of at least a predetermined number of IPSec packets after transmission of the previous acknowledgement packet, and

said second condition being the reception of a packet via the communication link after a predetermined time has passed after transmission of the previous acknowledgement packet,

- means for receiving acknowledgement packets for IPSec packets transmitted by the network node,
- means for obtaining a sequence number of an IPSec packet from a received acknowledgement packet,
- means for obtaining a value from the acknowledgement packet, said value corresponding to the amount of data received via the communication link by the second network node, and
- means for determining the packet success rate of the communication link at least partly on the basis of said value.

19. Software program product for a network node for communicating with the IPSec protocol with a second network node via a communication link, said software program product comprising at least

- software program code means for transmission of an acknowledgement packet if at least one of a first condition and a second condition is fulfilled,

said first condition being the reception of at least a predetermined number of IPSec packets after transmission of the previous acknowledgement packet, and

said second condition being the reception of a packet via the communication link after a predetermined time has passed after transmission of the previous acknowledgement packet,

- software program code means for receiving acknowledgement packets for IPSec packets transmitted by the network node,

- software program code means for obtaining a sequence number of an IPSec packet from a received acknowledgement packet,

- software program code means for obtaining a value from the acknowledgement packet, said value corresponding to the amount of data received via the communication link by the second network node, and

- software program code means for determining the packet success rate of the communication link at least partly on the basis of said value.